

CLAIMS

What is claimed is:

- 1 1. A circuit for protecting devices in an RF power amplifier comprising:
2 a peak detector coupled to an output of the power amplifier for detecting peak voltages at
3 the output of the power amplifier; and
4 control circuitry coupled to the peak detector and to the power amplifier for controlling
5 the gain of the power amplifier, wherein the control circuitry decreases the gain of
6 the power amplifier when the peak detector detects a voltage above a voltage
7 threshold.
- 1 2. The circuit of claim 1, wherein the peak detector further comprises:
2 a first peak detector having an input coupled to the output of the power amplifier; and
3 a second peak detector having an input coupled to a reference tone.
- 1 3. The circuit of claim 2, wherein outputs of the first and second peak detectors are
2 combined to provide a peak detection signal to the control circuitry.
- 1 4. The circuit of claim 3, wherein the first and second peak detectors are matched.
- 1 5. The circuit of claim 3, wherein the outputs of the first and second peak detectors
2 are combined by subtracting the output of the second peak detector from the output of the
3 first peak detector.

1 6. The circuit of claim 3, further comprising a divider circuit coupled between the
2 first peak detector and the output of the power amplifier.

1 7. The circuit of claim 1, wherein the divider is comprised of a first and second
2 capacitor coupled between the output of the power amplifier and ground.

1 8. The circuit of claim 1, further comprising a power detector coupled to the output
2 of the power amplifier and to the control circuitry for detecting the output power of the
3 power amplifier.

1 9. A circuit comprising:
2 an RF power amplifier having an input and an output;
3 a peak detector coupled to the power amplifier for detecting a peak voltage at a node of
4 the power amplifier; and
5 power control circuitry coupled to the peak detector and to the power amplifier for
6 controlling the gain of the power amplifier, wherein the power control circuitry
7 limits the power at the output of the power amplifier when the peak detector
8 detects a peak voltage greater than a threshold voltage.

1 10. The circuit of claim 9, wherein the peak detector is comprised of first and second
2 matched peak detectors.

1 11. The circuit of claim 10, wherein the first peak detector is coupled to the output of
2 the power amplifier and the second peak detector is coupled to a reference tone.

1 12. The circuit of claim 11, wherein the first and second peak detectors are matched.

1 13. The circuit of claim 9, further comprising a power detector coupled to the output
2 of the power amplifier and to the power control circuitry for detecting the output power
3 of the power amplifier.

1 14. A method of protecting devices in an RF power amplifier comprising the steps of:
2 detecting a peak voltage at a first node of the power amplifier;
3 determining whether the detected peak voltage is higher than a threshold voltage; and
4 if it is determined that the detected peak voltage is higher than the threshold voltage,
5 decreasing the gain of the power amplifier.

1 15. The method of claim 14, further comprising the step of detecting the output power
2 of the power amplifier.

1 16. The method of claim 15, wherein the gain of the power amplifier is increased if
2 the detected output power is less than a desired power level, and if the detected peak
3 voltage is lower than the threshold voltage.

1 17. The method of claim 15, wherein the gain of the power amplifier is decreased if
2 the detected output power is greater than a desired power level, or if the detected peak
3 voltage is higher than the threshold voltage.

1 18. The method of claim 14, wherein the peak voltage is detected using the steps of:
2 providing a first peak detector coupled to the output of the power amplifier; and

3 providing a second peak detector coupled to a reference tone.

1 19. The method of claim 18, wherein the first and second peak detectors are matched.

1 20. A method of controlling an RF power amplifier comprising the steps of:
2 detecting the output power of the RF power amplifier;
3 detecting a peak voltage at a first node of the power amplifier;
4 increasing the gain of the power amplifier if the detected output power is less than a
5 desired output power level and if the detected peak voltage does not exceed a
6 threshold voltage; and
7 decreasing the gain of the power amplifier if the detected output power is greater than the
8 desired output power level or if the detected peak voltage exceeds a threshold
9 voltage.

1 21. The method of claim 20, wherein the step of detecting a peak voltage is
2 performed using a peak detector.

1 22. The method of claim 20, wherein the step of detecting a peak voltage further
2 comprises the steps of:
3 providing a first peak detector coupled to the power amplifier;
4 providing a second peak detector coupled to a reference tone; and
5 combining the outputs of the first and second peak detectors.

1 23. The method of claim 22, wherein the first peak detector and the second peak
2 detector are matched.

- 1 24. The method of claim 22, wherein the outputs of the first and second peak
- 2 detectors are combined by subtracting the output of the second peak detector from the
- 3 output of the first peak detector.